SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1095.—Vol. XXVI.] LONDON, SATURDAY, AUGUST 16, 1856. [GRATIS.

ANUFACTURE OF IRON AND STEEL WITHOUT FUEL.

BY HENRY BESSEMER, ESQ.

e manufacture of iron in this country has attained such an important on, that any improvement in this branch of our national industry t fail to be a source of general interest, and will, I trust, be a suf- t excuse for the present brief, and, I fear, imperfect paper. I may on that, for the last two years, my attention has been almost exclu- directed to the manufacture of malleable iron and steel, in which, ver, I had made but little progress until within the last eight or nine s. The constant pulling down and rebuilding of furnaces, and the f daily experiments with large charges of iron, had already begun to st my stock of patience, but the numerous observations I had made g this very unpromising period all tended to confirm an entirely new of the subject which at that time forced itself on my attention—that d produce a much more intense heat without any furnace or fuel than be obtained by either of the modifications I had used; and, con- ntly, that I should not only avoid the injurious action of mineral n the iron under operation, but that I should at the same time avoid he expense of the fuel. Some preliminary trials were made on from to 20 lbs. of iron; and although, the process was fraught with derable difficulty, it exhibited such unmistakeable signs of success induce me at once to put up an apparatus capable of converting about of crude pig-iron into malleable iron in 30 minutes. With such s of metal to work upon, the difficulties which beset the small labo- experiments of 10 lbs. entirely disappeared. On this new field of ry I set out, with the assumption that crude iron contains 5 per cent. bon, that carbon cannot exist at white heat in the presence of oxygen, ut uniting therewith and producing combustion—that such combus- would proceed with a rapidity dependent on the amount of surface of n exposed; lastly, that the temperature which the metal would ac- would be also dependent on the rapidity with which the oxygen and were made to combine, and, consequently, that it was only neces- o bring the oxygen and carbon together in such a manner that a vast should be exposed to their mutual action, in order to produce a tem- re hitherto unattainable in our largest furnaces.

h a view of testing practically this theory, I constructed a cylin- vessel of 3 ft. in height, somewhat like an ordinary cupola furnace, terior of which was lined with fire-bricks; and at about 2 in. from ttom of it I inserted five tuyere pipes, the nozzles of which were d of well-burnt fire-clay, the orifice of each tuyere pipe being about in diameter. These were so put into the brick lining (from the ide) as to admit of their removal and renewal in a few minutes they are worn out. At one side of the vessel, about half way up he bottom, there was a hole made for running in the crude metal; the opposite side there was a tap-hole stopped with loam, by means ch the iron was run out at the end of the process. In practice, this ting vessel may be made of any convenient size; but I prefer that ld not hold less than 1 or more than 5 tons of fluid iron at each . The vessel should be placed so near to the discharge hole of the rnace as to allow the iron to flow along a gutter into it. A small linder would be required, capable of compressing air to about 8 lbs. . to the square inch. A communication having been made be- t and the tuyers before named, the converting vessel would be in tion to commence work. It would, however, on the occasion of being used after relining with fire-bricks, be necessary to make a he interior with a few baskets of coke, so as to dry the brickwork t up the vessel for the first operation, after which the fire would be all carefully raked out at the tapping-hole, which would again good with loam. The vessel would then be in readiness to com- work, and might be so continued, without any use of fuel, until k lining, in the course of time, became worn away, and a new as required. I have before mentioned that the tuyers are situated lose to the bottom of the vessel; the fluid metal will, therefore, rise in. or 2 ft. above them. It is therefore necessary, in order to the metal from entering the tuyere holes, to turn on the blast llowing the fluid crude iron to run into the vessel from the blast-

This having been done, and the fluid iron run in, a rapid boil- f the metal will be heard going on within the vessel, the metal sed violently about, and dashed from side to side, shaking the the force with which it moves from the throat of the converting Flame will then immediately issue, accompanied by a few bright This state of things will continue for about 15 or 20 minutes, hich time the oxygen in the atmospheric air combines with the ontained in the iron, producing carbonic acid gas, and at the e evolving a powerful heat.

as this heat is generated in the interior of, and is diffused in in- le fiery bubbles through, the whole fluid mass, the metal absorbs er part of it, and its temperature becomes immensely increased; he expiration of the 15 or 20 minutes before-named, that part of n which appears mechanically mixed and diffused through the n has been entirely consumed. The temperature, however, is so t the chemically-combined carbon now begins to separate from l, as is at once indicated by an immense increase in the volume rushing out of the throat of the vessel. The metal in the vessel s several inches above its natural level, and a light frothy slag s appearance, and is thrown out in a large foam-like masses. ent eruption of cinder generally lasts five or six minutes, when r appearance of it ceases—a steady and powerful flame replacing er of sparks and cinder which always accompanies the boil. The ion of carbon and oxygen which thus takes place adds still fur- he temperature of the metal, while the diminished quantity of resent allows a part of the oxygen to combine with the iron, ndergoes combustion, and is converted into an oxide. At the ex- mperature that the metal has now acquired, the oxide, as soon l, undergoes fusion, and forms a powerful solvent of those earthy t are associated with the iron. The violent ebullition which is mixes most intimately with scoriæ and metal, every part of thus brought into contact with the fluid, which will thus wash se the metal most thoroughly from the silica and other earthy ich are combined with the crude iron, while the sulphur and atile matters which cling so tenaciously to iron at ordinary tem- are drawn off, the sulphur combining with the oxygen, and ulphurous acid gas. The loss in weight of crude iron during sion into an ingot of malleable iron was found, on a mean of riments, to be 12½ per cent., to which will have to be added the etal in the finishing rolls. This will make the entire loss pro- t less than 18 per cent., instead of about 28 per cent., which is n the present system. A large portion of this metal is, how- ever, recoverable, by treating with carbonaceous gases the rich oxides thrown out of the furnaces during the boil. The slags are found to contain innumerable small grains of metallic iron, which are mechanically held in suspension in the slags, and may be easily recovered.

I have before mentioned that after the boil has taken place a steady and powerful flame succeeds, which continues without any change for about ten minutes, when it rapidly falls off. As soon as this diminution of flame is apparent, the workman will know that the process is completed, and that the crude iron has been converted into pure malleable iron, which he will form into ingots of any suitable size and shape, by simply opening the tap-hole of the converting vessel, and allowing the fluid malleable iron to flow into the iron ingot moulds placed to receive it. The masses of iron thus formed will be perfectly free from any admixture of cinder, oxide, or other extraneous matters, and will be far more pure, and in a sounder state of manufacture, than a pile formed of ordinary puddle bars. And thus it will be seen that by a single process, requiring no manipulation or particular skill, and with only one workman, from 3 to 5 tons of crude iron passes into the condition of several piles of malleable iron in from 30 to 35 minutes, with the expenditure of about one-third part the blast now used in a fiery furnace with an equal charge of iron, and with the consumption of no other fuel than is contained in the crude iron. To those who are best acquainted with the nature of fluid iron, it may be a matter of surprise that a blast of cold air forced into melted crude iron is capable of raising its temperature to such a degree as to retain it in a perfect state of fluidity after it has lost all its carbon, and is in the condition of malleable iron, which, in the highest heat of our forges, only becomes softened into a pasty mass. But such is the excessive temperature that I am able to arrive at with a properly shaped converting vessel, and a judicious distribution of the blast, that I am enabled, not only to retain the fluidity of the metal, but to create so much surplus heat as to remelt the cross ends, ingot runners, and other scrap made throughout the process, and thus bring them without labour or fuel into ingots of a quality equal to the rest of the charge of the new metal. For this purpose a small arched chamber is formed immediately over the throat of the converting vessel, somewhat like the tunnel-head of the blast-furnace. This chamber has two or more openings in the sides of it, and its floor is made to slope downwards to the throat.

As soon as a charge of fluid malleable iron has been drawn off from the converting vessel, the workman will take the scrap intended to be worked into the next charge, and proceed to introduce the several pieces into the small chamber, piling them up around the opening of the throat. When this is done he will run in his charge of crude metal, and again commence the process. By the time the boil commences, the bar-end or other scraps will have acquired a white heat, and by the time it is over most of them will have been melted, and run down into the charge; any pieces, however, that remain may then be pushed in by the workman, and by the time the process is completed they will all be melted, and ultimately combined with the rest of the charge, so that all scrap iron, whether cast or malleable, may thus be used up without any loss or expense. As an example of the power that iron has of generating heat in this process, I may mention a circumstance that occurred to me during my experiments; I was trying how small a set of tuyeres could be used, but the size chosen proved to be too small, and, after blowing into the metal for one hour and three-quarters, I could not get up heat enough with them to bring on the boil. The experiment was, therefore, discontinued, during which time two-thirds of the metal solidified, and the rest was run off. A larger set of tuyere pipes were then put in, and a fresh charge of fluid was run into the vessel, which had the effect of entirely remelting the former charge; and, when the whole was tapped out, it exhibited, as usual, that intense and dazzling brightness peculiar to the electric light.

To persons conversant with the manufacture of iron, it will be at once apparent that the ingots of malleable metal which I have described will have no hard or steely parts, such as are found in puddled iron, requiring a great amount of rolling to blend them with the general mass; nor will such ingots require an excess of rolling to expel cinder from the interior of the mass, since none can exist in the ingot, which is pure and perfectly homogeneous throughout, and hence requires only as much rolling as is necessary for the development of fibre; it, therefore, follows that, instead of forming a merchant bar or rail by the union of a number of separate pieces welded together, it will be far more simple and less expensive to make several bars or rails from a single ingot. Doubtless this would have been done long ago, had not the whole process been limited by the size of the ball which the puddler could make. The facility which the new process affords of making large masses will enable the manufacturer to produce bars that on the old mode of working it was impossible to obtain; while, at the same time, it admits of the use of some powerful machinery, whereby a great deal of labour will be saved, and the process be greatly expedited. I merely mention this fact in passing, as it is not my intention at the present moment to enter upon any details of the improvements I have made in this department of the manufacture, because the patents which I have obtained for them are not yet specified.

Before, however, dismissing this branch of the subject, I wish to call the attention of the meeting to some of the peculiarities which distinguish cast-steel from all other forms of iron—namely, the perfect homogeneous character of the metal, the entire absence of sand cracks, or flaws, and its greater cohesive force and elasticity, as compared with the blister steel from which it is made—qualities which it derives solely from its fusion and formation into ingots, all of which properties malleable iron acquires in a like manner by its fusion and formation into ingots in the new process; nor must it be forgotten that no amount of rolling will give to blister steel (although formed of rolled bars) the same homogeneous character that cast-steel acquires by a mere extension of the ingot to some ten or twelve times its original length. One of the most important facts connected with the new system of manufacturing malleable iron is, that all the iron so produced will be of that quality known as charcoal iron; not that any charcoal is used in its manufacture, but because the whole of the processes following the smelting of it are conducted entirely without contact with, or the use of, any mineral fuel; the iron resulting therefrom will, in consequence, be perfectly free from those injurious properties which that description of fuel never fails to impart to iron that is brought under its influence. At the same time, this system of manufacturing malleable iron offers extraordinary facility for making large shafts, cranks, and other heavy masses.

It will be obvious that any weight of metal that can be found in ordinary cast-iron by the means at present at our disposal may also be found in molten malleable iron, to be wrought into the forms and shapes required, provided that we increase the size and power of our machinery to the extent necessary to deal with such large masses of metal. A few minutes' reflection will show the great anomaly presented by the scale on which the consecutive processes of iron making are at present carried on. The little furnaces originally used for smelting ore have been from time to time increased in size until they have assumed colossal proportions, and are made to operate on 200 or 300 tons of materials at a time, giving out 10 tons of fluid metal at a single run.

The manufacturer has thus gone on increasing the size of his smelting furnaces, and adapting to their use the blast apparatus of the requisite proportions, and has by this means lessened the cost of production in everp way. His large furnaces require a great deal less labour to produce a given weight of iron than would have been required to produce it with a dozen furnaces; and in like manner he diminishes his cost of fuel, blast, and repairs, while he insures a uniformity in the result that never could have been arrived at by the use of a multiplicity of small furnaces. While the manufacturer has shown himself fully alive to these advantages, he has still been under the necessity of leaving the succeeding operations to be carried out on a scale wholly at variance with the principles he has found so advantageous in the smelting department. It is true that hitherto no better method was known than the puddling process, in which from 400 lb. to 500 lb. weight of iron is all that can be operated upon at a time; and even this small quantity is divided into homœopathic doses of some 70 lb. or 80 lb., each of which is moulded and fashioned by human labour, and carefully watched and tended in the furnace, and removed therefrom one at a time, to be carefully manipulated and squeezed into form. When we consider the vast extent of the manufacture, and the gigantic scale on which the early stages of the process is conducted, it is astonishing that no effort should have been made to raise the after processes somewhat nearer to a level commensurate with the preceding ones, and thus rescue the trade from the trammels which have so long surrounded it.

Before concluding these remarks, I beg to call your attention to an important fact connected with the new process, which affords peculiar facilities for the manufacture of cast steel. At that stage of the process immediately following the boil, the whole of the crude iron has passed into the condition of cast-steel of ordinary quality. By the continuation of the process, the steel so produced gradually loses its small remaining portion of carbon, and passes successively from hard to soft steel, and from soft steel to steely iron, and eventually to very soft iron; hence, at a certain period of the process, any quality of metal may be obtained. There is one in particular which, by way of distinction, I call semi-steel, being in hardness about midway between ordinary cast-steel and soft malleable iron. This metal possesses the advantage of much greater tensile strength than soft iron. It is, also, more elastic, and does not readily take a permanent set, while it is much harder, and is not worn or indented so easily as soft iron. At the same time, it is not so brittle or hard to work as ordinary cast-steel. These qualities render it eminently well adapted to purposes where lightness and strength are specially required, or where there is much wear, as in the case of railway cars, which from their softness of texture soon become destroyed. The cost of semi-steel will be a fraction less than iron, because the loss of metal that takes place by oxidation in the converting vessel is about 2½ per cent. less than it is with iron; but as it is a little more difficult to roll, its cost per ton may be fairly considered to be the same as iron. But as its tensile strength is some 30 or 40 per cent. greater than bar-iron, it follows that for most purposes a much less weight of metal may be used; so that taken in that way the semi-steel will form a much cheaper metal than any that we are at present acquainted with. In conclusion, allow me to observe that the facts which I have had the honour of bringing before the meeting have not been elicited from mere laboratory experiments, but have been the result of working on a scale nearly twice as great as is pursued in our largest iron-works—the experimental apparatus doing 7 cwts. in 30 minutes, while the ordinary puddling furnace make only 4½ cwts. in two hours, which is made into six separate balls, while the ingots or blooms are smooth, even prisms, 10 in. square by 30 in. in length, weighing about equal to ten ordinary puddle balls.

THE EFFECT PRODUCED UPON BEDS OF COAL BY THE WORKING AWAY THE OVER OR UNDERLYING SEAMS.

BY MR. GEORGE ELLIOTT.

[*Continued from the Mining Journal of July* 26.]

In the Usworth Colliery there is a large production of carburetted hydrogen gas, rendering the general use of candles and gunpowder unsafe; and although in some instances double the amount of score price was paid for working the portion of coal under the goaf, yet it was found insufficient to compensate the workmen for hewing it, and it became a question how the seam was to be worked at all. After struggling for a considerable length of time with this difficulty, before I arrived at the conviction of its cause (which was only done after repeated instances of the same effects), and observing that though the coal did not make the hissing noise, yet there was a considerable quantity of gas remaining in the hard places, I was obliged to change the system of working this colliery, which was to reverse the order of working hitherto observed, by stopping the upper seams and advancing the lower, so as to work the coals entirely out in them before approaching with the workings in the upper seams. My underviewer, Mr. Cole, explained to me that in working the lower seam under a goaf in the upper seam, laid down at Jarrow Colliery several years ago, a similar result had been met with, which to them seemed unaccountable.

The third instance I now give of the working seams of coal in a similar manner, at a less depth—80 fms. from surface—is from the Marchioness of Londonderry's collieries. A great extent of the coal there is at that depth, and has been worked extensively in the manner described in the several former instances; and there, as well as in many other similar cases, seams of coal have been worked under my direction, without appreciably showing any of the effects so strongly evidenced in those mines at greater depths.

The foregoing are some of the striking results I have observed in working seams of coal, where the coal in the upper seam had been taken away first. I shall now proceed to give a few instances of the effects produced on upper seams by the working of the seams immediately below them.

The old fashioned system of working coal in the North of England was what was called the *whole*, leaving pillars of adequate, or supposed adequate, strength to maintain the roof; and not unfrequently this has been done over a considerable area in three or four seams, the quantity of coal taken away being about one-third, leaving two-thirds. This condition of a colliery renders it very puzzling to the viewer to decide which is the best mode of working the remaining two-thirds, without occasioning considerable loss of coal by creating creeps, which indeed is almost impossible. If the course of working the pillars in the lower seam is decided upon, as soon as this is done extensively, the subsidence of the roof by the removal of the coal disturbs the pillars in the upper seams, and a creep is almost inevitable. On the other hand, if perhaps the safer course be adopted, and the upper seam is taken away first, then the violent falling in of the roof frequently occasions considerable injury to the seam imme-

diately below it, damaging the air-courses, wagon-ways, &c. The injury, however, does not not always extend in the same degree to the seams below, and I am, therefore, inclined to think that when seams of coal are so situated, all standing in pillars, more merchantable coal can be obtained by working the higher seams first, and so downwards.

The improvement of mining science and practical experience will henceforth, I have no doubt, prevent the future occurrence of the condition of things I have just referred to. Modern practise has decided that to leave large areas of pillars is neither so economical in the working of a colliery nor so safe against accident. The approved practice now being either to work the coals by means of long wall or by large pillars, removing them simultaneously with the working in the whole coal. Again, we have the system of working the lower seam entirely out first before entering the upper seam. This is frequently done without either much inconvenience or injury to the seam above, although frequent breakers or fractures come up from one seam to the others, when the chief difficulty is to deal with the gas that ascends from the lower seam; this, however, to my knowledge has never been found insurmountable, nor do I think that generally the working expenses of the upper seam are much increased, nor the per centage of small, neither is the size or quality of the large coal materially injured by this mode of working.

In many parts of the country there are certain covenants embodied in colliery leases, which prescribe that certain of the seams demised shall be worked first, and shall be worked in a certain manner. From a full consideration of the subject, it cannot fail to strike every one how difficult it is to lay down any fixed rule or system which would guide to the most effectual working of a series of seams of coal, as the two examples I have given at Monkwearmouth and Usworth most clearly show, that while in the former the working away the upper seam first improved the seam below in every respect, at Usworth the same rule applied rendered the lower seam almost valueless, and at collieries of less depth there is no appreciable effect produced.

Assuming that the phenomena witnessed in the instances cited will prove to be universal at those depths, it would require the mode of working to be varied to suit the circumstances of each case; still it is a most valuable discovery if it should, as I have supposed, affect the whole area of a royalty in the lower beds of coal, by the first working the upper seam (my observations have hitherto been confined to an area not exceeding 30 acres), and a great principle will have been ascertained and established—that the lower seams are improved in hardness, in yield of merchantable coal, the roof improved, and all the incidental work, except the hewing, economised by the system.

It will then become a question for practice and further experience to determine if it will not be the better way of working collieries, especially of great depth, by excavating the upper seam first, although as a rule the coal is not so strong, and yields more small coal than the same seam of coal would do at a less depth, and although it might not in itself be so remunerative to the owner to work, still I conceive the advantage gained by the improved value of the lower seams would fully compensate for the diminished profit on the upper seam. The peculiar result and disadvantage from working the upper seam at Usworth Colliery first will prove to be exceptional, and applicable only to similar situations where the coal is not required to be worked large, and where the use of gunpowder cannot be adopted.

Upon a careful review of all the circumstances arising out of the consideration of this interesting subject, I am of opinion that it will prove to be of permanent advantage to deep coal mines to work the upper seams first, and so improve the lower beds in hardness.

Meetings of Mining Companies.

WILDBERG GREAT CONSOLIDATED MINING COMPANY.

A preliminary meeting of the proprietors was held at the London Tavern, Bishopsgate, on Tuesday, Mr. ROBERT CARTER in the chair.

The CHAIRMAN said, that the meetings of the company, in accordance with the statutes, were necessarily held at Cologne; and although they had already had two annual ones, this might be called the first general meeting, as the inconvenience of attending at Cologne was so great that very few shareholders were present. Strictly speaking, they could not transact any business upon the present occasion; but they were called together to lay before them the reports and statements of accounts, showing the present state and prospects of the property in which they were interested, and that the shareholders might have an opportunity of expressing their opinion upon the propositions which would be submitted to the annual meeting on 29th inst. As, no doubt, there were many gentlemen present who were not original shareholders, he would shortly detail the proceedings. In 1853, the mines were recommended to five gentlemen in London as a property desirable to be possessed of, when Messrs. John Taylor and Sons were employed to select able parties to inspect them; and at their suggestion, Professor Phillips and Mr. Paul went out, and subsequently Mr. Arthur Dean was also sent out by one of the present members of the council, who was not interested in the original purchase; and all their reports confirmed the representations made to the promoters—that it was a very valuable property; and that, even whilst the machinery was being put up, the mine might be worked to advantage, and profits received. So far as to the latter part of the reports, they had been much disappointed, as upwards of two years had expired without showing profits; but as regarded the opinion given as to the wealth of the property they never had any doubt, and that had been confirmed by the reports of eminent parties who had recently inspected the mine; and it would be seen by those documents that, although a great mistake had been made in stating it would be immediately productive, the time had now arrived when he believed profits would be realised. It had been necessary for the council to incur debts in order to carry on the works at the mine, the estimate given of the amount required having been exceeded, which he believed was not an unusual circumstance in this country, where they could obtain agreements for the performance of work from first-rate contractors. When they commenced operations in Germany, they found no such persons existed in that country, and the cost of labour and materials had also greatly increased since they purchased the mines, the development of mining in Germany having caused a great demand for mining labour; the war had also had its effect. He (the Chairman) mentioned these circumstances in justification of the engineer, the increase of cost having been 50 per cent., and which was beyond the control of any one. The report stated that it would require further funds to work the mine profitably, and it would be satisfactory to inform them that those funds could be obtained without increasing the capital of the company. It might be remembered that last year they were engaged in litigation with one of the original promoters, who attempted, by fraud, to put a number of shares in his pocket. The decision of the legal authorities at Cologne, in Feb. last, had placed 20,120 shares at the disposal of the directors, with the exception of one-fifth, which would be reserved in the event of the party alluded to recovering them in this country, as the other promoters had given up their portion of the 20,120 for the benefit of the company. He would now call upon the secretary to read the report of the directors, the accounts, the reports of Prof. Ansted, Capt. Remfry, and Mr. Arthur Dean, the engineer; after which he should be happy to answer any questions that might be put to him.

Mr. BRANDT then read the report of the directors, to be presented to the third general meeting of shareholders, to be held at Cologne, August 29, from which we extract the following:—

After another year of difficulties and great anxiety, the council of administration have to report upon the progress made in the affairs of the company since the last meeting, and upon the present position and prospects of the mine. The works originally contemplated, together with some additional ones which the council have found it expedient to authorise, are now nearly completed, at an expense which has considerably exceeded the estimate; and the difficulties in the way of extracting a profit from the mine while the new works were in progress, have been found so insurmountable, that the working account to the present date exhibits a deficiency, instead of having produced a profit.

While the council deplore this state of things, resulting in the continued delay of a dividend, which the shareholders had reason to expect long since, it is satisfactory to know that the highly-favourable opinions of the intrinsic value of the mine which induced them to purchase it are fully borne out by recent surveys, and that the period has at length arrived when their expectations of profit will be realised.

Believing that the shareholders might require some evidence beyond that of our able and intelligent engineer, Mr. Arthur Dean, the council have lately requested Professor Ansted, and Capt. Remfry, of Stolberg, carefully to inspect the property, and to render to them a full, fair, and impartial opinion on the general capabilities and prospects of the mine, and on the efficiency of the machinery, &c., provided. The reports of these two gentlemen are appended hereto, and to them the council invite the particular attention of the shareholders. It will be seen, by the statement of accounts annexed, that the mine is in debt at present in the following amounts:—

On capital account	£13,891	3	4
On working account	7,208	18	10
	£21,100	2	2

The council have found great difficulty in carrying on the affairs of the company subject to this amount of debt, and cannot continue to do so unless the debt be paid off, or materially reduced; and the greatly extended operations of the mine, recommended in the reports referred to, will require a considerable amount of working capital to enable them to be carried on with advantage.

The sum of 7208*l.* 18s. 10d., at the debit of working account, has in reality been expended in clearing up the old workings, in developing the resources of the mine for future profit, and in the general management during upwards of two years that it has been nearly unproductive; for the council have adhered to the principle of limiting the charge on capital account to the expenditure connected with the new works. Thinking it inexpedient that the working account, now on the point of becoming productive, should be burthened with a debt which must be extinguished before profits can be divided, the council recommend that the above amount of 7208*l.* 18s. 10d. be transferred to the debit of capital account forthwith. It is extremely gratifying to the council to state that the shareholders have the means of providing the funds required, without any increase in the original capital of the company. It will be in their recollection that the council reported last year upon the legal proceedings in which they were engaged, both here and at Cologne, in consequence of a fraudulent attempt by one of the original purchasers of the mine to appropriate to his own use shares to the amount of 20,120*l.*, part of the company's purchase-money. The final Court of Appeal in Cologne decided, in February last, that the person in question, Count Kantorewiez, could not, under any circumstances, claim more than a fifth part of that sum; because, if any parties other than the company were entitled to it, it could be only the five original purchasers, of whom he was one; but as those five persons were all foreigners, the Court declared itself incompetent to decide the question as between them. The other four purchasers long since relinquished, in favour of the company, any interest they might have in these shares; consequently, the only portion of them that can be claimed from the company is the fifth, amounting to 4024*l.*, and these even the council believe never can be recovered. There remains, consequently, at the present disposition of the company, the remaining original shares to the value of 16,096*l.*, as well as the shares, value 10,000*l.*, reserved for works. The council recommend that these shares, amounting to 26,096*l.*, be now issued at par in ratable proportion to the present shareholders, bearing a preference dividend of 10 per cent. per annum in perpetuity, and participating with the other shares in any surplus profits beyond 10 per cent. upon the entire capital. If the shareholders should approve of this proposition, and take up the preference shares as suggested, it will be seen by the contingent account annexed that the entire debt will be paid off, and a cash balance of 4995*l.* 17s. 10d. will remain in the hands of the council, which, together with the stock of ore at grass and materials on hand, valued at 4961*l.* 7s. 2d., will be sufficient to pay for the completion of the works on the fixed capital account, estimated at 1965*l.*, and to furnish a floating capital for the efficient working of the mine.

The council are induced to recommend the issue of preference shares rather than any other mode of providing the funds which are required for realising any benefits from the mine, because it will give a certainty of a reasonable and immediate return to those who advance fresh capital for the general advantage; and it will create the least possible charge upon the shares first issued, inasmuch as there can now be little doubt but the whole will shortly receive dividends equal to or exceeding the rate of 10 per cent., to be paid on the preference shares.

The following statement of accounts was next submitted:—

Capital Account (Passive) to June 30, 1856.

Dr.—Purchase of mine and works, including shares to the value of 21,450*l.*, part recovered, and part not yet delivered up	£125,000	0	0			
Sundries, as detailed prior to June 30, 1855	15,397	15	3			
*Ditto, as per cash account to June 30, 1856	7,976	10	9			
Sundry merchants' bills, not yet paid	333	17	1			
June labour cost and merchants' bills	388	9	5	= £149,096	12	6
New Smelting Works:—						
Sundries, as detailed prior to June 30, 1855	1,087	17	10			
Ditto, as per cash account to June 30, 1856	2,478	2	8			
Sundry merchants' bills not paid	131	1	3			
June labour cost and merchants' bills	81	0	4	= 3,778	2	1
First instalment of loan to Burgomeister of Eckenhagen for new road, prior to June 30, 1855	150	0	0			
Second instalment ditto, since	150	0	0	= 300	0	0
Deposit for legal costs				100	0	0
Total				£153,274	14	7
Cr.—Amount of capital, in 75,000 shares of 2*l.* each	£150,000	0	0			
Less unissued shares	10,000	0	0	= £140,000	0	0
Balance				13,274	14	7
Total				£153,274	14	7

LIABILITIES.

Balance				£ 13,274	14	7
Further loan to Burgomeister of Eckenhagen for new road	£150	0	0			
Sundries	466	8	9	= 616	3	9
Balance in favour of capital account				16,678	16	8
Total				£ 30,570	0	0

ASSETS.

Loans repayable, as above				£ 300	0	0
Further loan to Burgomeister of Eckenhagen, repayable				150	0	0
5000 unissued shares, at 2*l.* each	£10,000	0	0			
+10,060 unissued shares, at 2*l.* each	20,120	0	0	= 30,120	0	0
Value of lands, houses, plant, furniture, &c., say				—		
Total				£ 30,570	0	0

Working Account (Active) for the year ending June 30, 1856.

Dr.—Balance from last account, June 30, 1856				£ 2,766	4	11
‡Sundries, as per cash account to date	£7,130	9	1			
Sundry merchants' bills not paid	110	9	6			
June labour cost and merchants' bills	413	9	8	= 7,654	8	3
Smelting cost, as per cash account to date	2,524	5	7			
Sundry merchants' bills not paid	27	8	9			
June labour cost and merchants' bills	526	6	0	= 3,078	0	4
Total				£ 13,498	13	6
Cr.—Silver sold	£2,172	2	8			
Lead sold	3,738	16	11			
Steel stone sold	15	19	6			
Sale of old plant	42	7	5			
Exchange account	14	3	11			
Incidental receipts	1	9	1	= £ 5,984	19	6
Balance				7,513	14	0
Total				£ 13,498	13	6

LIABILITIES.

Balance				£ 7,513	14	0
Council's attendance fees for two years, due Dec. 13, 1855, not yet paid	£1,050	0	0			
Ditto, travelling expenses, August, 1855	60	0	0			
Rent of offices, ¼ year to date	30	0	0			
General law bill to June, 1854	88	10	6	= 1,228	10	6
Total				£ 8,742	4	6

ASSETS.

Value of silver, lead, and litharge, in stock at Cologne, June 30				£ 1,533	5	8
Estimated value of copper regulus, litharge, ores, &c., at the mines, June 30				4,203	14	10
Value of stores and materials, June 30				757	12	4
Total				£ 6,494	12	10

Capital Account after the issue of Preference Shares, as proposed by Council.

Dr.—Balance of Capital Account to June 30, 1856				£13,274	14	7
Liabilities on ditto				616	8	9 = £ 13,891	3	4
Balance of working Account on June 30, 1856	£7,513	14	0			
Liabilities on ditto	1,228	10	6 =	8,742	4	6		
Less silver, lead, &c., sold since June 30, 1856	1,533	5	8 =			7,208	18	10
Balance						4,995	17	10
Total						£ 26,096	0	0
Cr.—Value of shares to be issued with preference div. of 10 per cent. viz.: Gross capital	£150,000	0	0			£ 26,096	0	0
Already issued	£119,880	0	0			
Retained to answer possible claim	4,024	0	0 =	123,904	0	0 = £ 26,096	0	0
Balance, as above						£ 4,995	17	10
Assets on working account						4,961	7	2
Gross amount applicable to further works, and for working capital						£ 9,957	5	0

* Including labour cost and materials from June 16 to December 31, 1853, paid to vendors, 405*l.*

† 1-5th of these shares may possibly be claimed, 4024*l.*

‡ Including labour cost and materials from June 16 to December, 31, 1853, paid to vendors, 1403*l.* 11s. 2d.

The CHAIRMAN said, he would next call upon the secretary to read the report of Prof. Ansted, who, he was glad to say, was in attendance, and would answer any question that might be put to him.—Prof. Ansted's report was then read, as follows:—

According to your instructions, and accompanied by Capt. Remfry, of the Stolberg Mines, I have visited and carefully inspected your mines, dressing-floors, and smelting-works at Wildberg, near Cologne. I have now the honour to submit the following report:

MINES AND UNDERGROUND WORKS.—Your concession at Wildberg includes the most valuable portion (nearly a mile in length) of a very remarkable channel or belt of ground, chiefly schistose, with quartz bands, occupying a tolerably well-defined position in the grauwacke or altered sandstone of that part of Germany belonging to the Devonian series of geologists. The channel of ground ranges north-west and south-east, dipping south-west, and its width, though nowhere proved underground, is estimated to average 50 fms. Within it, and perhaps beyond it, to the north-east, are a number of mineral veins or lodes, approximately parallel to the channel of ground, and to each other. There are also numerous strings which converge towards, or diverge from, the larger lodes. The lodes are frequently split, horses of intervening ground coming in between the hanging-wall and the footwall. These lodes and strings, and frequently the soft slaty ground near them, contain argentiferous galena, either disseminated in veinstone, with sparry carbonate of iron, forming regular courses, occupying a distinct position in the lode, or in large, wide, bunchy deposits. The grey portion of a lode not unfrequently reappears on the opposite wall, after thinning out on one side. The lead ore is frequently spotted with copper pyrites, and in the vicinity of quartz bands, especially where these are transverse to the general strike of the lodes, the copper pyrites is more abundant, and forms strings and small bunches of copper ore. The largest number of distinct strings or lodes bearing lead ore that have been hitherto intersected by one cross-cut is eight, but as the bearing ground is not completely crossed, other lodes of equal value may be looked for even beyond its limit. Everywhere there is proof of abundant ore existing in several courses, more or less, nearly parallel to one another, and all capable of being proved and conveniently worked together from a very small number of shafts. The dip of the lodes and strings is, on the whole, south-west, the pitch varying from nearly vertical to 45°. The principal deposits of ore have occurred near soft shales at or near embranchments, or at the places where strings or discovered portions of lodes come in contact either above or below. The usual ore is a peculiarly fine-grained soft galena: much of the ore, however, contains arsenic and antimony as well as silver, but the metal obtained from the smelting-house is singularly pure after desilvering, and has yielded, as I am informed by Mr. Dean, 45 ozs. of silver to the ton of lead. In addition to the lead and silver, a poor regulus, equivalent to about ⅛ per cent. of fine copper per ton of metal smelted, has also been pretty uniformly obtained. Without dwelling on the many points of interest presented in the Wildberg Mines, I may state in general that they afford a singular example of a wide extent and great length of orey ground, traversed by numerous valuable lodes and strings of argentiferous galena, each lode separately being subject to the usual irregularities of mineral veins, but altogether ensuring an exceedingly large and continuous supply of ore, which will ultimately be obtainable rapidly and with great economy. Several (three or four) of the larger deposits of ore have cropped out at surface, and still show a quantity of gossan of a very favourable character. These lodes, and others discovered in working them, have been the object of extensive mining operations for many centuries. With the exception of a few rich shoots of ore, followed down by sinks on the course of the lode to a depth of about 50 lachters from grass, it appears that the mines in the different lodes were successively abandoned, as the depth of each rendered it impossible to work to profit with hand-pumps and winzes. There are only two points known at which there are sinks below the deepest adit level, and one of these has been made within the last three years. There is no appearance in any part of the mine to suggest even a suspicion that the lodes are impoverished on going down. On the contrary, wherever the lodes are seen in the bottoms, they there offer the best and most promising appearances. There are two mines in the sett—the eastern and western—both in the same channel of ground. The former is reached only by the old deep adit level, while the latter is worked from the newer and deeper adit. A direct communication between the two mines will be obtained by the continuation of the new deep adit eastward, to the level from the bottom of the Turken sink driven west; the distance remaining to be driven is only 7 lachters. By continuing the level east from the bottom of the Turken sink, and cross-cutting at various points, the new deep adit will in a short time bring to view a very extensive piece of whole ground, known to contain several rich and powerful lodes and bunches of ore. Hitherto the old deep adit has been the principal level in the eastern mine, and as it has many cross-cuts and branches, some of which required to be cleared out and put in order before the mine could be well opened, a considerable but inevitable delay has taken place, which does not appear to have been contemplated in the early reports submitted to you. Such delays almost invariably take place when mines, however valuable, are taken again into work after a long period of neglect. There are five available shafts in the eastern, and three in the western mine. The deepest is Carter's, or the engine-shaft, down 52 lachters, and within 1½ lachter of the level of the new deep adit. As soon as this depth is reached, a cross-cut will be driven to cut all the lodes. Next in importance to the engine-shaft is that called Michael's schacht, which is now open to the old deep adit (Erbstolln), and which it is proposed to deepen to the level of the new deep adit by a sink on the course of Dean's lode. It is also proposed to make use of Michael's shaft for lifting ore by the aid of flat-rods from the engine, a distance of 75 lachters. Michael's shaft is especially convenient for this purpose, as numerous rich shoots and bunches of ore are about to be opened near the present bottom in the level of the Erbstolln. The western part of the eastern mine will be worked by these two shafts. The western mine is worked by two shafts, called fifth and sixth Licht Loch, and both these are already down to the new deep adit. The eastern part of the eastern mine is worked by two shafts, hitherto sunk to no great depth. Besides the two adits above referred to, whose distance apart is 11 lachters, there is one principal level, 17 lachters above the Erbstolln, and two intermediate ones (mittel strecken), one between the two adits, and the other between the Erbstolln and the upper level. The ore being for the most part removed above the Erbstolln, these and other upper levels are of minor importance. It will be evident, from this brief account of the principal shafts and levels, that the real work of opening the mine still remains to be done, and there is as yet no system of winzes sunk, and levels driven, to show reserves in the sense commonly understood by that expression. On the other hand, however, the mine is really so far laid out by the preliminary work of the past year, that a large number of miners might now be placed where they will at the same time be able to get ore, and also open numerous lodes, and secure reserves for the future. This is owing to the fact that six or eight courses of ore are in sight, and that on several of these drivings, sinks and rises may be immediately commenced with great advantage, by means of which large quantities of ore may be raised, but which are really exploring works. After going carefully over the mine (both eastern and western), in company with Capt. Remfry and Mr. Dean, I am satisfied that as soon as the communication between the two mines is completed, 148 miners may be placed with advantage in stoping, driving, rising, or sinking on lodes, or opening orey ground, at the same time, and for exploration in dead ground, 28 additional miners will be required. Following out the plan suggested by Mr. Dean (and in the expediency of which I fully concur), between 70 and 80 miners, in addition to these 176, will be required before the expiration of a year from the regular commencement of the works, but by that time it is estimated that more than 700 square lachters of ground will have been proved on several courses of ore parallel to one another, and close together, while large reserves would also have been secured in other parts of the mine. Without detailing particulars of the extent of the various courses of ore seen underground, and examined by Capt. Remfry and myself, I can state with confidence that, taking an average produce of 35 per cent. as the standard, at least 240 tons of dressed ore per month can be raised on an average during the coming year, provided the requisite number of miners and other hands can be obtained. After the mine is developed, and there are reserves of ore, the quantity will greatly increase.

The above estimate refers to silver-lead ore only, this ore yielding, as has already been stated, one-half per cent. of copper. A small quantity of copper ore might also be raised from the spots and occasional stones that are found in all the lodes. Although there is one lode—called the Kupfergang—a copper lode, making occasionally a good string of yellow ore, I am not inclined to estimate the value of the mine in this respect very highly. It is possible, and not unlikely, that at some depth, and at the junction of some of the intersecting quartz lodes with the schists, large bunches of copper ore may be found, but I saw nothing to warrant a special search for this metal. The yield of silver obtained from the desilverising pans is stated by Mr. Dean to average about 45 ozs. to the ton of manufactured lead. I am of opinion that up to the present time there has been a loss of silver in washing, and that the black slates near the orey parts of the lodes are often argentiferous. It is desirable that samples of ore from the various lodes of the schists and slates near the lode, and of the copper ore and stahlstein associated with the galena, should be submitted for analysis to some experienced chemist to determine the contents of silver. Considering the difficulties and delays incidental to all mining operations in old mines that require to be cleared out and reopened, I do not consider that there has been any time lost in the preliminary works of your mine. The works underground are now almost completed, and you require only additional hands and a few hundred fathoms of light rail to admit of good paying-work being commenced.

SURFACE WORKS.—Carter's shaft is provided with a capital Cornish engine and one boiler; with another boiler this engine can draw the mine to 150 fms., besides other work. It is proposed to connect this with the Michael shaft by flat-rods, and to lift ore from both; the distance is 75 lachters; besides the engine, there is a large whim and shears at Carter's shaft. The engine lifts all the water to the surface, whence it is conducted by covered launders to a large upper storage reservoir, hence it is carried by other covered launder to feed a large 40-ft. water-wheel, working the crushers and stamps; a portion of the main stream and the water from the tail of the wheel is then available for washing the crushed and stamped ores, and afterwards passes down into lower storage reservoirs having a sufficient fall to turn another wheel if required. From the lower reservoirs the water can, if necessary, be lifted again to the level of the dressing-floors, thus ensuring an ample supply, independent of seasons and weather. An ample space of ground is admirably laid out for dressing-floors in a succession of terraces, on which the various sheds and houses are already placed, and crushers, stamps, jigging machines, and other mechanical contrivances for separating the ores, are either ready or in the course of preparation. Considerably more space is required to be covered in before winter in order to secure the means of dressing the large quantity of ore it is proposed to raise; and I strongly recommend that a first-rate dresser should be procured as soon as possible to take the management of this department. It will evidently be useless to raise ore if it cannot be dressed as rapidly as it is raised; and, considering the severity of the winter at Wildberg, it is highly desirable that the capacity of the dressing-floor should always exceed the estimated quantity of ore to be raised per month. At present it would be difficult to dress 100 tons per month, and it is proposed to raise 240. At the same time it must be remembered that a part of the ore would require nothing more than hand picking. The distance from the mines and dressing-floor to the smelting-house is about a mile and a half, over a good road, and there will be no difficulty in laying down a tram to run the dressed ore into the smelting-house by its own gravity. There is a convenient spot and water power for a second dressing-floor near the sixth Licht Loch shaft, in the western mine; but at present nothing has been done in this part of the property; and the rich ores brought up from the Blumengang are merely hand-picked, leaving a large heap of poch erz, or ore fit for the stamps. The old dressing-floors, stamps, jigging machines, and percussion tables, with the wheel and other machinery connected with them, cannot be regarded as of any value; they are situated too far from the mines, and are altogether in too imperfect a state to be retained when the principal floors are completed. The smelting-house is large, convenient, and well placed near the public road, at the point where it branches to the Wildberg Mines. The buildings are in good condition, and contain three cupolas, and place for a reverberatory smelting-furnace, not yet built; the flue has a total length of 940 ft., the rise being 120 ft. on the slope of the hill behind the works, and 60 ft. in a vertical shaft. There are at present no chambers, but these can be added hereafter. Besides the smelting-furnaces there is a double reverberatory roasting furnace, a calcining furnace, and refining hearth, a reducing furnace, a Scotch hearth, and nine pans for desilverising by Pattinson's process. Coal is used in calcining, and wood in some of the processes, coke being only required in smelting. The works are provided with a convenient office, a laboratory, and a residence for the head smelter, and are on a sufficiently large scale to make and desilverise 150 tons of metallic lead per month, when in full operation. The smelting charges at present are heavy, as the quantity of work done is small compared with the capacity of the works, but there is an unquestionable economy in smelting on the spot, as the price given for ores in the neighbourhood is understood to be very small, and the cost of conveying ore to the nearest coal district would be much greater than that of bringing the fuel to the works. The manufactured lead as sold is of very unusual purity, both as determined by assay and as appreciated in the Cologne market, to which it has been principally sent. I find on examining the results of smelting during the past year that the loss in smelting has averaged nine per cent. on the estimated contents by assay; the yield of silver averaging rather more than 45 ozs. to the ton of lead, and the cost of smelting 46s. 9d. per ton of lead ore of 35 per cent. During this period a little more than 1000 tons of ore of that average were smelted, and 274 tons of lead produced. Almost all the ore was hand-picked.

The balance of poor ores remaining to be stamped and dressed, after the removal of the lumps and coarse ore, is estimated at nearly 4000 tons, which, when the dressing-floors are completed, should yield 250 tons of slimes, worth upwards of 50 per cent. The addition of these slimes, therefore, would have had the effect of raising the general percentage of ore smelted, and diminishing the smelting charges. It is also exceedingly probable that, with proper treatment on the dressing-floor, the yield of the slimes for silver would be much higher than that of lump ore. The distance of the mines from Cologne is about 50 miles, and the present cost of conveyance averages 20s. per ton, being contracted for at 24s. from and 16s. to Cologne. The railway in course of construction from Cologne to Giessen, by Wissen, will bring the mines within 12 miles of a station, and greatly reduce all charges. At present, coal costs 40s. per ton coming by way of Cologne, but could then be obtained from the coal-field direct at a very much lower price. Assuming, however, present prices as the basis of calculation, and taking it for granted that the required number of mining and other hands can be obtained, I beg to submit the following estimate of costs and returns for one year from the commencement of regular working. In subsequent years, when the mine is completely opened, the communications improved, and the dressing-floors and smelting works in full activity, the costs would be much less in proportion, and the quantity of ore reduced greater.

MONTHLY COSTS.

216 miners, at an average cost of 16 thalers per month				£ 520	0	0
250 hands, at an average of 7 thalers				262	10	0
Salaries and agencies				100	0	0
Coal (excluding smelting), iron, timber, ropes, powder, sundry stores, and sundry local expenses				216	10	0
Smelting charges on 240 tons of ore, at 46s. 9d. per ton				561	0	0 = £1600	0	0

MONTHLY RETURNS.

240 tons of 35 per cent. ore, yield say 75 tons of lead, sold at 20*l.* per ton nett				£1500	0	0
75 × 45 = 3375 ounces silver, at 5s. 6d. per ounce				928	2	6
6 tons copper regulus of 20 per cent., at 16*l.*				96	0	0
4 tons dressed copper ore, of 12 per cent., at 10*l.*				40	0	0 = 2564	2	6
Monthly profit						£ 964	2	6
To this may be added a profit on (say) 100 tons of lead ore, or undesilverised lead, bought and reduced at the smelting-works, for the purpose of keeping that establishment in full operation (say)						100	0	0
Total						£1064	2	6

In conclusion, I have great pleasure in congratulating you on having possession of a mine exceedingly remarkable for the quantity of ore that can be obtained from its numerous lodes at a moderate cost; the high value of these ores, in consequence of the silver they contain; and the prospect there is of the mine increasing rather than diminishing in productiveness for a long time to come. The delays incident to all mines on their first establishment, but especially to mines in which extensive old workings have to be re-opened, are now nearly at an end. Your dressing-floors are advancing, and may soon be available. Your supply of water for dressing the ores is likely to be steady and equal to the demand, owing to the arrangements already completed, and you are provided with a smelting establishment amply sufficient for all purposes. The outlay still required for dead-work underground, for railway iron for the construction of tram-roads, and for

...ching the dressing-floors, is not very considerable, but is absolutely necessary to ...ure an early return on the capital already invested.—D. T. ANSTED.

The report of Capt. Remfry was next read, from which the following is extracted:—"I do not deem it necessary for me to go into geological details of the country: I therefore leaving that subject for my colleague to deal with. At the same time, I cannot pass on without noticing the very interesting character of the group of veins which are to be seen in this mine. There appears to be one great channel or chamber into passing through the country. Within this channel (which is strongly mineralised) is formed a group of veins, many of them of great strength and productiveness. The general character of the veins is of the most favourable description, and, in my opinion, cannot fail to be productive. The works on the mine have been carried out in a most efficient manner, reflecting great credit on your engineer. In the present mine, 90 men may be employed on different veins to break ore, which I estimate would produce 130 tons of silver ore per month. The new dressing-floors are well arranged, but, in my opinion, they must be extended, there being ample room for that purpose. Taking the lead, silver, &c., at the present price, and the cost of working the mine and smelting works at about 1750*l.* a month, a profit equal to 2,000*l.* may be made during the next 12 months; and my opinion is, that the prospects of the mine at the end of that period will be such as to warrant greater results."

The report of Mr. Arthur Dean, the engineer, was next submitted. It stated that the engine, or Carter's shaft, had been widened down to the old adit level; that Carter's shaft had been sunk from the old adit down to nearly the level of the deep adit; that a powerful steam-engine had been erected at Carter's shaft; that an extensive series of cross-cuts should be prosecuted to prove untried parts of the old workings. The report thus concludes:—"I beg to observe that the mines have now arrived at a point that clear and demonstrative evidence exists of the great value of the lode, and that their richness is quite equal to the opinions originally formed of their worth, the mines are now clear and open for regular and systematic working, that they are furnished with all the necessary appliances for their prosecution on a large scale, that the smelting works are erected, and the difficulties attending the reduction of the ore overcome; and that, in short, with a full supply of labour no doubt can exist of the favourable results which the proprietors may in future expect from their undertaking."

The CHAIRMAN then proposed a resolution, to the effect that the present meeting approve of two resolutions, to be submitted to the meeting to be held at Cologne, on Aug. 29, in accordance with the statutes of the company. The resolutions were—That the report of the council of administration be received, adopted, and circulated. That the council be authorised to issue shares to the extent of 26,096*l.*, or such portion of the same as they may determine to issue, such shares to be entitled to a preferential dividend of 10 per cent., and that all such alterations and modifications to be made in the statutes shall be made as may be deemed necessary.

The CHAIRMAN explained that, to be represented at the meeting, it was necessary for the proprietors to deposit their share certificates in London or Cologne, when per would be supplied with a proper form of proxy, entitling to one vote for every 50 shares. As it was highly desirable they should have the opinion of as many shareholders as possible, he trusted the applications would be numerous.

Mr. PETER DAVEY wished to know what proportion of the new shares would be offered to the present proprietors?

The CHAIRMAN replied, about one in four. They would send a circular to all the parties they knew, and should advertise the resolutions; and, as it was not expected that they would take them up, proprietors might apply for a larger or smaller proportion.

Mr. DAVEY wished to know, in the event of the profit reaching 10,000*l.*, as mentioned in the report, the per centage it would pay upon the whole capital?

Col. E. L. UNDERWOOD replied, that he had made a calculation, and found it would be about 7 per cent. on the original shares, in addition to the 10 per cent. on the preference shares.

Mr. C. TWYNAM wished to know whether the preference shares would be given probably to the present holders?

The CHAIRMAN said, they would be offered in the first instance to them. In answer to further questions, the CHAIRMAN said, the estimates were based upon a lower price of metal than they had yet sold at, and the expenses estimated at the high rates they had been paying recently both for labour and materials, in which there was a prospect of reduction. A railroad, which would be within a short distance from the mines, was now in the course of construction under Government, and was under contract to be completed in 18 months from the present time.

Col. HAY considered 8 per cent. would be sufficient to pay on the preference shares.

The CHAIRMAN replied, after much consideration the board was unanimously of opinion 10 per cent. was the proper rate to offer.

Mr. DAVEY suggested that the new shares should be paid for by instalments, which would be a great relief to the large holders, and induce many to take them up.

The CHAIRMAN said it was a valuable suggestion, and should be attended to. He was then unanimously carried.

The CHAIRMAN again impressed upon the proprietors the necessity of being represented at Cologne, and trusted a large majority would obtain proxies.

Mr. DAVEY said, the difficulties they had gone through had been principally surmounted by the attention paid to their affairs by the worthy Chairman, and he had to propose a vote of thanks to him for presiding over them this day. He considered it was very fortunate they had a gentleman like him to conduct their affairs. He again thanked him, and hoped that for a long time they might have him to preside over the Wildberg Company. (Cheers). The council being added, the resolution was seconded and carried amidst much applause.

The CHAIRMAN thanked them sincerely on the part of his colleagues and himself. It had been an anxious time for all of them. He hoped they had passed their difficulties, and that they would soon meet with smiling faces by giving them good dividends. It was gratifying to them to find such a strong expression of confidence. The proceedings then terminated.

PENINSULAR MINING COMPANY.

The half-yearly general meeting was held at the London Tavern, on Tuesday,

Sir EDWIN PEARSON in the chair.

Mr. GREEN read the notice convening the meeting, and the following report:—

The subjoined accounts give detailed particulars of the receipts and disbursements for the past half-year. The receipts consist of 1174*l.* 17*s.* from sales of copper ore, 36*l.* 17*s.* from antimony ore, and 169*l.* 19*s.* 2*d.* taken from stock account, which, with the balance on hand January 1, makes 1953*l.* 16*s.* 4*d.* The expenditure has been 696*l.* 11*s.* 7*d.* for mining expenses, 226*l.* 6*s.* 9*d.* for law charges, including cost of Chancery suit, and 181*l.* 15*s.* 8*d.*, in other payments, making in all 1704*l.* 14*s.*, leaving a balance of 249*l.* 2*s.* 4*d.* Nothing has occurred to alter the views expressed by the directors at the last general meeting respecting the Dichosa Consols, from which as much ore as is practicable has been extracted, and, therefore, they have abstained from further extending their operation on this mine. At the Verdeona Mine a good lode of copper ore has been cut at the 23, and at the Purissima lead mine the adit level has been extended for the purpose of discovering the lode, for particulars of which the shareholders are referred to the report of Mr. Mason, the company's engineer.

The company has had, throughout, the disadvantage of being the first to explore, to any considerable depth, the extensive district inwhich their mines are situated, and although it contains at the surface the outcrops of large lodes, extending through the district, the scientific gentlemen who have reported upon it have not yet been able to determine which is the champion lode of the country. The Verdeona Mine and the big lode are still being proved, and it is hoped that the results will be more satisfactory than the trials first made at the Dichosa Consols.

Reports were also read from Capt. James Mason, extracts of which have already appeared in the *Mining Journal*.

The subjoined statement of accounts, to June 30, was submitted:—

Estimated balance profit brought forward ...	£1375	0	9			
Copper ore sold	1414	17	0			
Antimony	201	17	0			
Estimated value of copper ore on hand	1200	0	0=	£4191	14	9
Stock on hand, Jan. 1	£1900	0	0			
Mining expenses	846	4	0			
Fee to Capt. Hitchins	10	10	0			
Portion of Huidobro profit	200	0	0			
Stores, salaries, rent, &c.	239	7	10=	3196	1	10
Leaving balance (profit)				£995	12	11

The CHAIRMAN said they had determined to take out all the copper from the Dichosa, and then stop the works, the mine having become greatly impoverished. The same observation would apply to the big outcrop lode. It was intended to confine operations to the Verdeona and Purisima concepcion, from which they expected good results.

Mr. COWLAND, at considerable length, explained the working of the company from the commencement, and contended they ought at once to wind-up, proposing a resolution to that effect.

Mr. BISGOOD proposed as an amendment that they continue operations, which was carried by a large majority.

The meeting was then made special, for the purpose of bringing the company under the Limited Liability Act, which was agreed to; and a vote of thanks to the Chairman terminated the proceedings.

THE IBERIAN MINING COMPANY.

The half-yearly general meeting of the company was held at the London Tavern, Bishopsgate, on Tuesday,—Sir EDWIN PEARSON, Bart., in the chair.

Mr. GREEN (the secretary) read the notice convening the meeting, and the following report:—

The call of 1*s.* per share, made at the last half-yearly meeting, was appointed by the directors to be paid on April 3: it has been well responded to, 163*l.* 3*s.* 7*d.* only remaining unpaid on June 30. The financial accounts annexed show the receipts to be—From sales of lead ore, 2047*l.* 9*s.*; loans, 1385*l.*; from stock account, 66*l.* 7*s.* 6*d.*; which, with the call of 1*s.* per share, and balances in hand Jan. 1, make 5188*l.* 19*s.* 2*d.* The disbursements amount to 4220*l.* 5*s.* 1*d.*, consisting of mining expenses, 1554*l.* 4*s.* 1*d.*; repayment of loans and interest, 2195*l.* 8*s.* 4*d.*; and expenses in England, 470*l.* 12*s.* 8*d.*: leaving balance in hand, including arrears of call, 968*l.* 14*s.* 1*d.* The mining operations of the past six months have been confined to Nos. 1 and 3 lead mines, for particulars of which the directors refer to the half-yearly report of Mr. Mason, the company's engineer and agent in Spain. It is satisfactory to the directors to be able to state that, since their last report, the workings in Spain have resulted in a profit; that the monthly produce of lead ore continues good; and that the future prospects of the company encourage the vigorous prosecution of the works. They are looking forward with hope to the cutting of the lode in depth in No. 3 lead mine, which the engineer reports will probably be reached by the deep adit during the month of September next. The progress of the company's operations have been slow, in consequence of the directors having restricted them to somewhat narrow limits, so as to keep the expenditure within the small calls which have been made; but should the mines meet the expectations of the mining engineer, the works may be considerably extended, and the returns increased out of the ore raised from the mine.

The report of Capt. Mason was read, which has appeared in the *Mining Journal*.

The subjoined statement of accounts, to June 30, was submitted:—

Balance last account	£ 559	5	10			
Lead ore sold in England	2010	18	5			
Ditto in Spain	36	10	7			
Ditto on hand	1070	0	0=	£3676	14	10
Stock on hand, Jan. 1	£1130	0	0			
Mining costs, Spanish salaries, &c.	1083	15	6			
Secretary, clerks, rent, interest, &c.	129	15	6			
Vote to directors	200	0	0			
Fee to Capt. Hitchins	10	10	0=	2554	1	0
Leaving balance (profit)				£1122	13	10

The CHAIRMAN congratulated the company upon their very favourable position, although they were at present opening out the Nuestra Senora de Begona, from which they expected such great results, the Tres Amigos Mine had yield sufficient to pay all expenses, having realised 900*l.* beyond the total charges incurred in exploring the Nuestra Senora de Begona, where they had arrived at a very critical point, as within six weeks they fully expected to reach the lode. The great point was to ascertain whether they were really in a metalliferous district, and that had been fully proved by explorations on the opposite side of the hill to the Nuestra Senora de Begona, and he hoped in two or three months to be in a very different position. They had been recently extracting 20 tons of ore per month, and, at the low price charged, after paying every expense, including those in London, had netted about 700*l.*

Mr. ORTON wished to know how much would give a good dividend?

The CHAIRMAN replied that 40 tons per month would give 20 per cent. upon the whole capital.

Mr. GREEN said the profits the last six months had been enough to pay 10 per cent.

The report and accounts were then unanimously adopted, and Capt. Greig re-elected director, and Mr. Robinson auditor.

Mr. BISGOOD said they appeared now to be entirely out of debt, and had a good balance to work with.

The CHAIRMAN said, such was the satisfactory state of affairs; and he would remind them that in January last they were 800*l.* in debt.

Capt. GREIG said the prospects were very different from 12 months back, when he fully expected they would wind-up.

The meeting was then made special, for the purpose of bringing the company under the Joint-Stock Companies Act, 1856; and, after some discussion, a resolution was passed to that effect, with limited liability.

A vote of thanks to the Chairman and directors terminated the proceedings.

CASTILIAN MINING COMPANY.

The half-yearly meeting was held at the London Tavern, Bishopsgate, on Tuesday,

Sir EDWIN PEARSON in the chair.

Mr. GREEN (the secretary) read the notice convening the meeting, and the following report:—

This company was formed early in May, 1855, in accordance with the prospectus then issued, and, after complying with the usual preliminary forms, received its certificate of complete registration on Aug. 3, 1855.

The purchase of the mines, machinery, and plant has been completed on the terms stated in the prospectus, for 8133 shares of 10*s.* each, and 4000*l.* in cash; the shares and 3500*l.* of the purchase money have been handed over, leaving 500*l.* still unpaid.

The directors, as soon as possible after the formation of the company, dispatched Capt. Jehu Hitchins to Spain, with full authority to carry his dressing process into operation, in accordance with the terms of his letter of May 15, 1855, inserted in the prospectus. He left London for that purpose in July, taking Capt. Heath with him as his manager in Spain; unfortunately, soon after his arrival, Capt. Hitchins was taken seriously ill, and compelled to return to England, without having, in any perceptible degree, forwarded his plans at Huidobro. He was unable to go back until November, and finding that in this long interval Capt. Heath had not carried out his instructions he replaced him by Capt. John Hitchins. The Messrs. Hitchins then pushed forward their operations for about two months, the trials then made giving promise of very good results, when Capt. Jehu Hitchins was obliged again to return to England, leaving his representative to complete the works then begun. Captain John Hitchins continued the processes for about four months longer, but was unable to arrive at results equal to those which were originally anticipated.

Under these circumstances the directors regret that they cannot announce the success of Capt. Jehu Hitchins' experiments as regards the lighter ores, though he has succeeded in dressing the "burnt furnace leavings," and the "halvans" at a profit, both of which were formerly laid aside as useless.

The only course, therefore now open, is to continue the old furnace plan of concentrating the poor ores, coupling with it the dressing plan ac to the "burnt leavings" and the "halvans;" and by the three processes it is calculated that about 40 tons of copper ore, of not less than 10 per cent., will be produced monthly, at a fair profit.

A statement of accounts to June 30 was exhibited, from which the following is condensed:—

Mining expenses	£2326	2	0			
Mining salaries, &c.	253	6	6			
Liabilities	71	0	0=	£2650	8	6
Copper ores sold in England	£1239	11	11			
Ditto in Spain	61	12	2			
Copper ore on hand	1260	0	0			
Transfer fees, &c.	5	6	2=	2566	10	3
Balance against the company				£	83	18	3

Capt. Jehu Hitchins, in his report, states, that to prove the process they proposed to adopt they made a water-course nearly a mile in length, excavated and built reservoirs, and fixed appliances necessary for the new dressing-floors, to do all which in that locality occupied much more time, and was attended with a great deal more difficulty, than he had anticipated. Captain Hitchins added that he was of opinion, founded on the experience of the last seven months, during which the operations have been carrying on and progressing regularly, that with system and economy, such as can now be better observed, as all the floors are laid out, and the second furnace ready, and perseverance, that this mine ought to yield fair profits to the adventurers for some time to come, and should it prove otherwise he should attribute the failure to the management there.

The CHAIRMAN, in moving the adoption of the report and accounts, said he had nothing to comment upon, as those documents fully explained the position of the company. He could only say that the process pursued in reference to the mines had not answered as Capt. Hitchins had hoped it would; at the same time, it had succeeded to a certain extent, and, if steadily proceeded with, he believed they would have favourable returns. Under the former system, they had burnt 30 tons of leavings. Two furnaces were now erected, and from burnt leavings and the halvans they looked for a good return; but he would call upon Capt. Hitchins, who had made an elaborate report, to state his views.

Capt. JEHU HITCHINS said it was due to the proprietary and to himself to state that he certainly had thought more highly of the mine than the results justified; but to show the sincerity of his motives, he begged to say he was much out of pocket, because he had taken a great part of the risk upon himself, and had induced many of his friends to engage in the adventure. He believed that if the concern were carried on under ordinary circumstances, it would realise a fair profit, but in mining affairs untoward circumstances would arise, in spite of all forethought. All their appliances were fixed; they had no expenses to incur under that head, and he was of opinion that the mine would ultimately pay.

The CHAIRMAN, in answer to a question by a proprietor as to whether the plant should not be removed from the Castilian to the Peninsular Mines, explained that the ore in the two classes of mines was totally different, and that the apparatus was not applicable to both cases.

After a lengthened discussion, the report and accounts were unanimously adopted.

The meeting was then made special, and a resolution unanimously passed to register the company with limited liability under the Joint-Stock Companies Act, 1856. A vote of thanks to the Chairman and directors terminated the proceedings.

RATING OF MINES TO THE POOR.

We may revert to the Rating of Mines question, to notice perhaps the most important evidence elicited by the Select Committee of the House of Commons,—that of Mr. Thomas Field, of Threadneedle-street. This evidence appears to show the bearing of the case in the truest possible manner, and, therefore, cannot fail to interest all concerned.

Mr. FIELD stated that he had a large capital invested in mines, and had given much attention to the subject of rating them. His impression was that it would be most injurious to mining were this bill, or anything approaching it, passed. He thought it would be the means of deterring a vast amount of capital from finding its way into Cornwall, and other mining districts. The introduction of the measure was looked upon in London and elsewhere, where a large portion of the capital is found for exploring Cornish mines, as an attempt on the part of the landed proprietors of Cornwall to saddle the non-resident shareholders with a portion of the rates that should be borne by the residents in that county. He objected to the lords being rated for dues, as he thought mines, fisheries, and such uncertain pursuits, should be exempted from rates. He contended that the adventurers assisted to support the poor, and in many cases they paid much more to the doctor and club fund than they would have to pay to the rates were they imposed. He thought where the doctor and club was paid, it was the same as if rates were paid; it was paid undoubtedly by the adventurer, although it is nominally paid by the miner. In Great Wheal Alfred they had expended 30,709*l.* 6*s.* 8*d.* in excess of all returns from the mine; therefore that amount had been positive loss to the shareholders. They contracted to pay 1-30th dues, but in consequence of the great outlay they had made it had been reduced to 1-60th during pleasure, which amounted, according to the returns for the last six months, to 163*l.* 17*s.* per annum. These royalties did not pay poor-rates; it being a money payment. Supposing the dues to be the basis of rating, he found that their doctor and club would amount to about 15*s.* in 1*l.* of the total amount of dues paid in that mine, so he maintained that in that mine they supported their own poor by means of that fund. Twenty-five or thirty years ago it was an enormously rich mine, and had paid large dividends. He did not call it evading the rate; he said that they paid their poor-rates in another form, and, therefore, if they paid the poor-rate in the usual form, and paid also the doctor and club fund, they would be paying the poor-rate twice. The nature of the payment to the doctor and club fund was this,—there was 1*s.* per month deducted from each man's wages, 6*d.* of which went to the doctor's fund and 6*d.* to the club fund, in the event of accidents and illness, but accidents more particularly; they do not profess to take notice of cases of illness. A man frequently got his 30*s.* per month, which prevented his applying to the parish, and he had a medical man to attend him in case of illness, so that he had not to send for the parish doctor. The sum allowed was about 30*s.* per month. He was aware that the rules of some clubs only take cognizance of accidents. Supposing a man had given his strength and sinews to mining operations, and became exhausted and worn out at a very early stage of life, that man was not for any length of time on the club; but he had known many instances where, in the case of men so situated, a sum had been advanced by the club; he had known as much as 20*l.* or 30*l.* advanced to enable a man to get his living in some business. He did not think that, as a general rule, the relief from the club was confined to accidents entirely. It was certainly not exactly the fact that the mine had the benefit of the man's labour, and the ratepayer, whoever he might be, had the charge of maintaining him in his old age; but, in some cases, there was no question that it would be pretty nearly so. The mine contributed nothing to the club beyond the deduction made from the wages of the men; but in the event of the club becoming poor, and the funds being exhausted, he had never known a case where the adventurers had neglected to pay. In consequence, if a club become rich, it is always treated as the property of the company, and not of the miners. Generally speaking, when a mine stopped with a balance in hand of the club money, that balance was not retained for the purpose of the miners who are on the club; it is divided amongst the adventurers; but before such division he had known, in all cases which he could call to mind, that those who were on the club received a sum of money for the purpose of enabling them to get a living in some other way. There had been, generally speaking, much liberality shown where such cases had existed. He had known as much as 30*l.* given; he believed the man was very seriously injured, and he was put into a small shop, which was stocked for him. He was speaking from memory only, and, therefore, was not quite certain as to the amount. He held that the money so subscribed by the men was subscribed by the adventurers; all courts of law had taken that view of the case. He did not know a case of a mine in the county of Cornwall where a fund does not exist, but his impression was that if the bill were to pass they would be discontinued. When a mine stopped, and the company took possession of the funds of the club, if there are any recipients at that time on the list of the club, they are dealt with in various ways. Sometimes the club fund was not divided for a considerable time after the mine ceased to work, and in other instances their cases were considered, and a sum of money appropriated to them; the weekly pay then ceased. He thought that the benefit which arose to the neighbourhood was so great that the general ratepayer could well afford to bear the burden: that benefit arose from the large amount of money circulated in the district, which, of course, tended most materially to increase the business and profits of all parties connected with trade in the immediate locality of the mine. The same remark applied to agriculturists. For a distance, in many cases, of two or three miles, perhaps, they would be considerably benefited by it. There was much employment in mines for carriers and whim-drawers; in fact, half the small farmers in Cornwall, in the mining localities, look principally to the mines to pay their rent. He thought the benefit was greater than the loss which arose to them from supporting the mining poor, and hence it was that their rates in Cornwall were so low; their average was much below that of the United Kingdom. Again, if a man got damaged by a threshing-machine, he has to go to the parish doctor, and get relief from the parish, whilst the miner was supported from the mine. He thought there was an indisposition on the part of the miners generally to go to the Unions. He had taken up several setts himself; he never had any dispute whether the payment should be in money or kind, and had never made any other than a money payment. He had never heard the slightest complaint from the other ratepayers; on the contrary, they were always glad to see a mine start in their locality. He held in several mines in Wales, and in one in Scotland, and he had an interest in a mine in Spain. He was Chairman of the Great Wheal Alfred, in Cornwall; the opening and working of that mine, together with three or four other mines—viz., Alfred Consols, West Wheal Alfred, and West Alfred Consols—had been the means of improving the neighbourhood to an enormous extent. He should think that since those mines had been set to work the population of Hayle and Copperhouse was one-third more than it was before they commenced working. He had been presented with a piece of plate, in consequence of the good effect produced by the opening and working of those mines. He knew a great many cases of the dues being wholly given up for a long period. In some of the best mines in Cornwall the dues had been given up for years, the effect of which had been that the lord had received a large amount of royalty, when, if the dues had not been given up, he believed the mines would have stopped. He believed the effect of rating even upon legitimate mining speculation would be most disadvantageous, and would deter many persons from engaging in mining. Mining leases were generally very stringent; in fact, he believed there were very few mining leases which could be carried out in all their integrity. They were one-sided documents altogether. The adventurers paid the property tax upon profits, and they had not the means of deducting their losses. The general practice in Wales, as far as his experience went, was to pay the dues in money. At the Vale of Towy Mine, near Carmarthen, he had never paid any poor-rate, except for some small house or two, amounting to 1*l.* or 1*l.* 10*s.* a year, but not on dues. He thought that agitating the question year by year had also an injurious tendency on legitimate speculation. He had no means of ascertaining what money the small farmers made by carting. He believed they occasionally took the carriage at a very low price, but he had known them combine also, and they do so in most cases; they had sufficient intelligence to protect themselves. There was coal to bring to and ore to take from the mine, and also considerable removal of ore upon the mine. The usual plan was to sample and sell, monthly, tin, lead, and copper; therefore the work was not exactly continuous. Immediately after a sale there was work perhaps for four, five, or six days, and during the remainder of the month there was little to do; it came in very well with their other work. The carriage was set, in the case of Great Wheal Alfred, from Hayle, Marazion, Perran Wharf, and Truro, at per ton; and where they could not estimate the quantities—so much for a 1-horse cart, and so much for a 2-horse cart. Those who cart coals, ores, and so on, had not continuous work from one mine—their habit was to take many mines; therefore they generally employed their carts continuously, and had to keep an extra number of horses beyond what they required for the cultivation of their farms. They are sent for when wanted, and must come, even in harvest time, or they would be liable to a fine. He thought a portion of the rate would eventually fall upon the adventurer, even if the lord were rated. Although lords' dues were rated in Derbyshire with perfect satisfaction to all parties, it was quite possible that if there were no rates paid in Derbyshire, and a more liberal rate were adopted by the lords, the mines would be more extensively wrought than at present. There were instances in Derbyshire where the lords took 1-13th dues, but the terms were frequently one-half of that—1-26th. He could not explain upon what principle the Derbyshire mines should be rated to the poor and the Cornwall mines excepted, except that they had not the benefit of doctor and club, which he believed amounted in Cornwall to as much as the rates in Derbyshire. Wherever clubs existed, it was another form, in his opinion, of supporting their own poor. In the case of mines, the club money was put down just as much as the charge for powder and candles, or any other article consumed by the miner would be; and therefore, he contended, it was really money paid by the proprietor, and not by the men. He was not aware that that was the case in large works where large bodies of men were employed, and yet they were rated to the poor; nor that in the formation of railways, the contractors paid the men such wages as would enable them to lay by a portion to pay a doctor. He was not mixed up with other works than mining where a large number of men were employed. The mines in which he was concerned in Wales were not assessed to the poor. He had an interest in a lead mine in Scotland, but he was not sure whether it was rated: he had bought the mine some few months previously, his impression being that there was a money payment, and therefore no poor-rate.

It is stated that the subject will be resumed next year, when the enquiry will be extended to every description of mining throughout the United Kingdom.

CENTRIFUGAL PUMPS.—At our last visit to the Crystal Palace we were unable, owing to the late period of the week, to give any detailed account of the actions of the pumps in the Court for Machinery in motion; we now endeavour to supply the deficiency in our last report. The general arrangement of Gwynne and Co.'s Patent Centrifugal Pump, as at present manufactured (one of which can be daily seen at work at the Crystal Palace), is somewhat different to that exhibited at the Great Exhibition in 1851. The principle of the pump remains the same: the disc is constructed with straight arms radiating from the centre, and slightly inclining or turned backwards when they approach or intersect the circumference; the length or form of sweep is varied according to the work the pump has to perform; where the lift is high the sweep is short and small; where it is low it is larger and longer. Truth will, however, out eventually, no matter what length of time may elapse. The jury of Class 5 of the Great Exhibition of 1851, took no little trouble in ignoring the facts regarding centrifugal pumps; they awarded a medal for a pump with curved arms, which, in truth, is not a centrifugal pump, for the centrifugal force is destroyed by this arm. They admitted this pump, for which the awarded the only medal, was not constructed on a new principle; the curved arms had been used previously, and the form of the disc they found fault with, or rather suggested improvements; nothing was new but the pump case, which was anything but mechanical, or adapted to meet the wants of those requiring such machinery. Even this has been abandoned by the gentleman who has obtained the medal, and yet it could only have been for this that the jury awarded it. How they could have done so, under such circumstances, we cannot understand: it could not have been to reward an inventor, for there was no invention; nor could it have been to advance the interests of science, for the principle was old. However, having compromised themselves, they determined to make the best of it, and tried, by a considerable amount of reasoning and deductions, to prove that the curved arms were most proper, and the straight nearly valueless. Although these statements were put forward and circulated very largely, it did not deter those who were convinced the theory of the curved arms were erroneous, these last pursuing a steady and slow course, overcoming the prejudices and errors of those who should not have endorsed such a hasty opinion. It happens, after five years have elapsed, that two pumps, one with curved arms, and the other with straight arms, should be placed side by side in the Machinery Court of the Crystal Palace, and, what is more singular, they are worked by the same engine. These two pumps are known to the public as Appold's and Gywnne's. The most casual observer cannot fail to mark the difference between the size and performance of the two. Gwynne's, with straight arms, is a very small affair, compared with Appold's, which has curved arms; it does not occupy half the space, and its cost is much less, yet Gwynne's raises more water with the same power, and that to a greater height by four feet. This is not an isolated case, large numbers of pumps with straight arms, on Gwynne's principle, have been erected since 1851, under all sorts of circumstances, with lifts varying from 20 to 80 feet. In quantity, from 20 to 20,000 gallons per minute, as needed. They have invariably given the greatest satisfaction to all those concerned, and have tended to show the world at large the soundness of the principles on which they have been constructed: theory, however dazzling it may be, must always give way to practice. It is a pleasant duty for us on all occasions to render honour where it is due; and, although the jurors of the Great Exhibition of 1851 did not render that justice which should have been awarded to Gwynne and Co., we believe that the public, by their patronage, have shown them they have duly appreciated their useful invention, and that the centrifugal pump, both as regards utility and profit, will yet realise the expectations of its inventors.

THE METAL TRADES.—A very useful Chart, prepared by Mr. Johnston metal merchant, of Glasgow, is now ready: it contains, amongst other information of the greatest interest to all connected with the metal trades, an elaborate diagram, showing at one view the prices of the principal metals during the past 16 years, the Birmingham wire and metal guages and the modern Belgian zinc guage, the weight and thickness of lead piping of various diameters, &c., thus forming a valuable work of reference for the counting-house of the iron merchant or broker. Copies may be had at the office of the *Mining Journal*. Price: Mounted, on rollers, 21*s.*; on plain sheet, 15*s.*

*** TAPPING'S PRIZE ESSAY ON THE COST-BOOK SYSTEM, enlarged and augmented, with Notes and an Appendix, can be had at the MINING JOURNAL office, 26, Fleet-street,—Price 5*s.*

*** MINING JOURNAL.—The VOLUMES for 1854 and 1855, perfect, with Index and Title-page, strongly bound, to be sold—price 9*l.* each.

THE BRYNGLAS SILVER-LEAD MINE, CARDIGANSHIRE.

On the "COST-BOOK PRINCIPLE."—No deed to be signed.
Liability of shareholders limited.

Capital £6000, in 4000 shares, at £1 10s. each; 15s. per share to be paid upon allotment.

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R. S. FRANCE, Esq., Sibberscott, Salop, and Talbot-chambers, Shrewsbury—MANAGING DIRECTOR.
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RESIDENT CAPTAIN—Mr. Thomas Owen.
GENERAL INSPECTOR—Capt. John Hughes, Talybont, Cardiganshire.

OFFICE,—TALBOT CHAMBERS, SHREWSBURY.

PROSPECTUS.

The Bryngias Mine is situated in one of the richest lead districts in Cardiganshire. Some of the most productive lodes run through the sett, which is of great extent. It is distant about 12 miles from the shipping port of Aberystwith, and close to the main road leading from Kington. The mine has been worked for several years, and large quantities of lead have been raised; rich beds are at present laid open, and may be further worked with the greatest advantage, only requiring machinery to do so.

The important geological features of the surrounding strata having attracted and excited the admiration of several experienced mineralogists, who have concurred in pronouncing this to be amongst the most important discoveries of the locality, and have advised an immediate and more extensive course of operations; and it is to carry out these views that the present company is established. Already the greater part of the introductory work has been done, by sinking shafts, driving levels, cutting water-course, wheel-pit, &c., in which some thousands of pounds sterling have been expended.

The importance of this sett as a silver-lead mine, and its mineralising properties, have been clearly shown, and proved beyond all doubt by the ore already raised from the ground worked. This fact, with the facilities afforded for working the mine by means of an amply-powerful and never-failing stream of water running close to the mouth of the adit level, together with the small amount of capital required for erecting the necessary machinery, with the certainty of a handsome profit resulting therefrom, must, in the united opinion of parties competent to speak of the capabilities of the mine, place Bryngias, not as a speculation, but a simple and safe investment for capital.

This mine has recently come into the hands of the present proprietors, after a long contest for possession by several parties wishing to secure so valuable a property, and is held under lease from Edward Lloyd Gatacre, Esq., for a period of 21 years, at a royalty of one-fourteenth.

The workings comprise six adit levels, and two well-arranged shafts, a water-course conveniently constructed, and cut through strong rocky ground, with a wheel-pit prepared. The lode varies from 3 to 6 feet wide, producing lead of the purest quality; and it is expected that, as soon as the machinery is erected, large quantities of ore will at once be raised. The ore is full 8 inches solid at the bottom of the shaft; consequently, it is satisfactorily ascertained that it only requires the erection of machinery to make good and immediate returns to the adventurers.

A considerable outlay (amounting to several thousand pounds) has been made upon these mines, in driving the levels, shafts, &c. The whole of this is now secured by a payment of £760, and by the addition of a further sum of about £1000, to be expended in the requisite machinery, three-quarters of the whole mine is obtained. With these facts under consideration, there can be no reasonable doubt but the Bryngias Mine will, as Captains Hancock, Owen, Hughes, and Hosking, state, prove a highly remunerative undertaking; and the present proprietors are so well satisfied with the soundness of the project, that they have agreed to accept shares for the remaining one-quarter of the mine, in place of money.

In order, therefore, to effectually work this very promising "silver-lead mine," it is proposed to raise a capital of £6000, in shares of £1 10s. each, 15s. of which to be paid on allotment; and this sum, it is expected, will be ample to place the mine in a state of efficient and profitable working.

It may be here stated that the price of shares in three mines in this locality, one of which is the same lode as this mine, is quoted in the last number of the *Mining Journal* as follows:—

Cwmystwith Lead Mine, £60 paid—price per share, £180.
Lisburne ..... £18 paid—price per share, £200.
Cefn Brwyno ..... £5 paid—price per share, £85.

To these may be added the Welsh Potosi, a mine situated in the same locality, which paid a clear profit to the shareholders, on two months' working, of Five Thousand Five Hundred and Fifty-seven Pounds Two Shillings and Three Pence.

A considerable number of shares have already been applied for by parties resident in the neighbourhood, who have had the best opportunities of judging of the soundness of the undertaking, and have shown their confidence by embarking capital for its further prosecution. With these facts under consideration, it is clear that few opportunities have presented themselves to the public of entering upon mining operations with a greater certainty of success.

The very great expense attending the management of mines in London has determined the proprietors of Bryngias Mine to conduct their operations in Shrewsbury, so as to scrupulously avoid all unnecessary outlay; and at their office in Shrewsbury specimens of the ores may be seen.

EXTRACTS FROM THE REPORTS OF CAPTS. HANCOCK, OWEN, HUGHES, AND HOSKING.

I would refer you to the Welsh Potosi Mine, which fell into the hands of the present adventurers just as the Bryngias now does, and that undertaking has shown a profit to the shareholders in a few months of £5557 2s. 2d. (see report, *Mining Journal*, Jan. 5, 1855); and I undertake to say that, as soon as the wheel and pumps are put up, and cross-cuts made from the shaft, a profitable discovery of lead will be made at Bryngias. If my views be correct, the ore ground at present discovered is a sufficient guarantee for effectually working this mine. WILLIAM HANCOCK,
Cwmellan Mines, near Rhyader.

The crystallising nature of this vein indicates large bodies of metal, containing a great deal of killas, mundic, altogether what any miner will pronounce most favourable appearances; it only, therefore, remains for me to say that, with a comparative small outlay for machinery, and being properly explored, there cannot be a doubt but it will prove highly beneficial to the adventurers. WILLIAM OWEN,
Manager of Caylan and Ash Brook Mines, Talybont.

In conclusion, I beg to say, with the local advantages of this mine, the high road passing over the back of the mine, water-power for every purpose passing by the mouth of the adit, a good quarry of durable stone for any purpose required close to the mine, together with the very forward state of the levels, shafts, with water-course and wheel-pit made, also being in the midst of the great rich metalliferous district; this, I say, without any further prospects or consideration, and quite apart from the extreme richness of the lode, should be of itself a sufficient guarantee to warrant the embarkation of a capital for its prosecution; but, in addition to this, the lode being discovered, and (so far as it has been tested) proving highly favourable, I consider, on the whole, the undertaking one offering more than ordinary inducement for the investment of capital. J. HUGHES,
Manager of the Potosi Mine.

In conclusion, allow me to say that not a doubt rests on my mind that the lode in this sett will prove equally rich with those worked in the neighbouring mines, and that, at no distant period, the result will terminate with large returns to the shareholders for their outlay, and place Bryngias amongst the list of dividend-paying mines. JAMES HOSKING, Manager of North Wales Consolidated Mines.

FORM OF APPLICATION FOR SHARES IN THE BRYNGLAS SILVER-LEAD MINE.

(To be addressed to the managing director, at the offices, Talbot-chambers, Shrewsbury.)
To the Committee of Management of the Bryngias Silver-Lead Mine.

GENTLEMEN,—I request you to allot me parts or shares in the above undertaking, and I hereby agree to accept the said parts or shares, or any less number you may allot me, and to pay the sum of 15s. on each part or share at the time specified in your letter of allotment.

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No further call to be made during a period of 12 months; and if required after that period, not to exceed 2s. 6d. per share, and at intervals of not less than 3 months.

The reports from this mine are exceedingly favourable, the drivings having extended 32 fathoms, and the miners daily expect to cut the lode in the lowest level, which will undoubtedly yield abundance of rich lead ore; from this lode it is believed large dividends will be paid.

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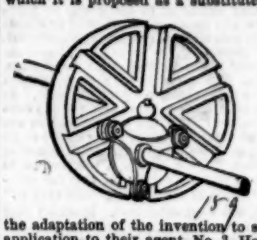

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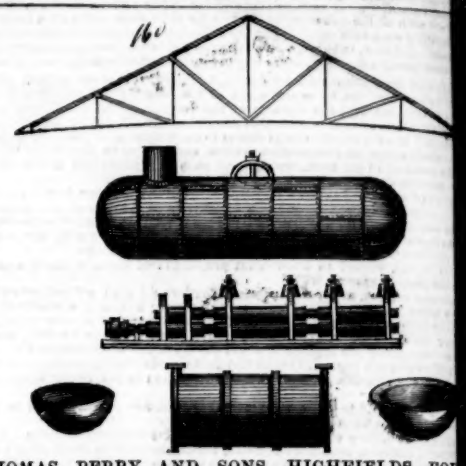

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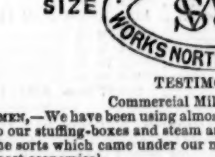
SIZE 

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